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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/568,644
Filing Date: February 16, 2006
Appellant(s): JOHNSON ET AL.

Gregory L. Thorne
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/14/09 appealing from the Office action mailed 4/14/09.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

7,012,600	Zehner et al.	20 November 2002
7,176,880	Amundson et al.	21 July 1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-9, 11, 13-18, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Zehner et al. (US 7,012,600).

Regarding claim 1, Zehner discloses an electrophoretic display panel, comprising: an electrophoretic medium comprising charged particles (col. 1, line 30-35,

the invention relates to bistable electro-optic displays, especially electrophoretic displays);

a plurality of picture elements (col. 6, line 22 "plurality of pixels") having electrodes associated with each picture element for receiving a potential difference (col. 15, line 25-40 explains the active matrix display architecture);

and drive means (see fig. 2, column drivers 24 and row drivers 22),

the drive means being arranged for controlling the potential difference of each picture element to be a grey scale potential difference for enabling the particles to be driven to a position corresponding to the image information from a preceding optical state (col. 5, line 24-26 and more specifically, col. 6, line 20-38, the "look-up table method", see also col. 7, line 7-23, controller is arranged to output a signal representative of impulse required to change pixel from initial to final state),

the potential difference being a sequence of preset potential differences having preset values and associated preset durations (col. 28, line 23, the so-called "prepulse slide show waveforms", determined by the "look-up table method" referenced above),

the preset values in the sequence alternating in sign (col. 28, line 44-47, pairs of pulses are described which are typically of equal impulse and opposite polarity),

each preset potential difference representing a preset energy sufficient to release particles present in one of said extreme positions from their position but insufficient to enable said particles to reach the other one of the extreme positions (col. 28, line 44-47, numerous impulses of varying energy may be used, examples are given in the disclosure).

wherein the drive means are further arranged for application of the grey scale potential difference for at least a subset of all drive waveforms (col. 7, line 39-41, the “look-up table method” in which the output signal represents a plurality of pulses, see also col. 10, line 15-27, the use of "sub-scan periods” for the relevant grey scale transition)

for setting a picture element from a preceding optical state to a grey scale in two or more pulses (col. 7, line 39-41 the use of a plurality of pulses discussed above, see also col. 10 line 15-27, the use of “double-prepulse waveforms”)

which change the optical state of the system separated by a non-zero time interval (see table 2, as well as col. 21 line 47-51, “sequence of impulses designed to accomplish an image transition”)

and are arranged for prior to application of the grey scale potential difference, driving a reset potential difference of each picture element (see fig. 8, reset pulse 304 is prior to the write image step 306)

to drive the particles to occupy an extreme position (col. 26, line 9-11, reset step 304 drives pixels to extreme white or black states)

which is determined based on which extreme position is closest to a position of the particles which corresponds to the image information (col. 30, line 56-59, the display can be divided into two or more groups and different reset pulses [namely driving to either white or black] can be applied to the different groups, see also col. 31, line 34-38, "the pixels may be divided into groups which use different reset steps differing in number and frequency of pulses).

Regarding claim 2, Zehner discloses the electrophoretic display panel as claimed in claim 1, wherein the drive means are arranged for, during the non-zero time interval, applying a voltage value below a threshold voltage value below which the particles remain substantially in their position (col. 14, line 37-40, the voltage applied is close to zero when there are no pixels undergoing transitions, also see col. 9 line 31-33 and col. 12, line 61-65 describing the "zero transition").

Regarding claim 3, Zehner discloses the electrophoretic display panel as claimed in claim 1, wherein the drive means are arranged for, during the non-zero time interval, applying a voltage value of substantially zero (col. 14, line 37-40, the voltage applied is zero when there are no pixels undergoing transitions, also see col. 9 line 31-33 and col. 12, line 61-65 describing the "zero transition")

Regarding claim 4, Zehner discloses the electrophoretic display panel as claimed in claim 1, wherein the drive means are arranged for controlling the potential difference of each picture element to be a reset potential difference (see fig. 8, reset pulse 304) having a reset value and a reset duration (col. 30, line 47-52, “number and duration of reset pulses can be varied") for enabling particles to substantially occupy one of the extreme optical positions (col. 30, second paragraph describes in detail a particular implementation of a reset pulse scheme).

Regarding claim 5, Zehner discloses the electrophoretic display panel as claimed in claim 1, wherein the drive means are further arranged for application of the grey scale potential difference over more than two pulses (see table 2, as well as col. 21, line 47-51, the impulses described "may be part of a sequence of impulses").

Regarding claim 6, Zehner discloses the electrophoretic display panel as claimed in claim 1, wherein the drive means are further arranged for application of the grey scale potential difference in two pulses (again see table 2, as well as col. 21, line 47-51, as well as col. 10, line 15-17, specifically mentioning "double-prepulse waveforms").

Regarding claim 7, Zehner discloses the electrophoretic display panel as claimed in claim 1, wherein the drive means are arranged for application of the grey scale potential difference in two or more pulses (see above) wherein the applied pulses have decreasing time duration as the driving time increases (col. 21, line 60-67, specifically "gray states can be obtained by modulating the length of the voltage pulse applied to the display", see also col. 7 line 39-42, and see fig. 6).

Regarding claim 8, Zehner discloses the electrophoretic display panel as claimed in claim 1, wherein the drive means are arranged for application of the grey scale potential difference in two or more pulses (see above) wherein the applied pulses have decreasing amplitude as the driving time increases (col. 21, line 60-67, specifically "gray

states can be obtained by... modulating the applied voltage", see also col. 7 line 39-42, and see fig. 6).

Regarding claim 9, Zehner discloses the electrophoretic display panel as claimed in claim 1, wherein the drive means are arranged for application of the grey scale potential difference in more than two pulses (see above), the pulses are separated by at least two non-zero time intervals, and the time intervals increase as the driving time increases (same rationale as above, combined with col. 22, line 19-25, specifically "the effective resolution can be increased by imposing a nonlinear spacing of the voltage steps", thus the time intervals can increase as the driving time increases).

Regarding claim 11, Zehner discloses a method for driving an electrophoretic display device comprising: an electrophoretic medium comprising charged particles (col. 1, line 30-35, the invention relates to bistable electro-optic displays, especially electrophoretic displays);

a plurality of picture elements (col. 15, line 25-40 explains the active matrix display architecture),

the method comprising acts of: applying grey scale potential differences for setting a picture element to an optical state from a preceding optical state for at least a subset of all drive waveforms (col. 5, line 24-26 and more specifically, col. 6, line 20-38, the "look-up table method", see also col. 7, line 39-41, the "look-up table method" in

which the output signal represents a plurality of pulses, see also col. 10, line 15-27, the use of "sub-scan periods" for the relevant grey scale transition)

in two or more pulses (col. 7, line 39-41 the use of a plurality of pulses discussed above, see also col. 10 line 15-27, the use of “double-prepulse waveforms”)

separated by a non-zero time interval (see table 2, as well as col. 21 line 47-51, “sequence of impulses designed to accomplish an image transition”);

the grey scale potential difference being a sequence of preset potential differences having preset values and associated preset durations (col. 28, line 23, the so-called “prepulse slide show waveforms", determined by the "look-up table method" referenced above),

the preset values in the sequence alternating in sign (col. 28, line 44-47, pairs of pulses are described which are typically of equal impulse and opposite polarity),

each preset potential difference representing a preset energy sufficient to release particles present in one of said extreme positions from their position but insufficient to enable said particles to reach the other one of the extreme positions (col. 28, line 44-47, numerous impulses of varying energy may be used, examples are given in the disclosure).

and prior to application of the grey scale potential difference, applying a reset potential difference of each picture element (see fig. 8, reset pulse 304 is prior to the write image step 306)

to drive the particles to occupy an extreme position (col. 26, line 9-11, reset step 304 drives pixels to extreme white or black states)

which is determined based on which extreme position is closest to a position of the particles which corresponds to the optical state (col. 30, line 56-59, the display can be divided into two or more groups and different reset pulses [namely driving to either white or black] can be applied to the different groups, see also col. 31, line 34-38, "the pixels may be divided into groups which use different reset steps differing in number and frequency of pulses).

Regarding claim 13, this claim is rejected under the same rationale as claim 5.

Regarding claim 14, this claim is rejected under the same rationale as claim 6.

Regarding claim 15, this claim is rejected under the same rationale as claim 9.

Regarding claim 16, this claim is rejected under the same rationale as claim 7.

Regarding claim 17, Zehner discloses a computer program comprising program code for performing the method as claimed in claim 11 when said program is executed on a computer (fig 8 is described as a flow chart illustrating a program which may be run by the controller unit, see also col. 13, line 11-13 and line 38-39, explaining how the method could be practiced on a computer in conjunction with appropriate equipment, as well as implemented in software or incorporated as a part of a CPU).

Regarding claim 18, Zehner discloses a computer program product comprising program code stored on a computer readable medium (col. 13, line 43-44 explains that the look-up table(s) are stored in memory accessible to the controller) for performing the method as claimed in claim 11 when said program is executed on a computer (fig 8 is described as a flow chart illustrating a program which may be run by the controller unit, see also col. 13, line 11-13 and line 38-39, explaining how the method could be practiced on a computer in conjunction with appropriate equipment, as well as implemented in software or incorporated as a part of a CPU).

Regarding claim 20, Zehner discloses drive means (see fig. 2, column drivers 24 and row drivers 22) for driving an electrophoretic display panel,

said display panel comprising: an electrophoretic medium comprising charged particles (col. 1, line 30-35, the invention relates to bistable electro-optic displays, especially electrophoretic displays);

a plurality of picture elements (col. 6, line 22 "plurality of pixels") having electrodes associated with each picture element for receiving a potential difference (col. 15, line 25-40 explains the active matrix display architecture);

drive means arranged for controlling the potential difference of each picture element to be a grey scale potential difference for enabling the particles to occupy the position corresponding to the image information (col. 5, line 24-26 and more specifically, col. 6, line 20-38, the "look-up table method"),

the grey scale potential difference being a sequence of preset potential differences having preset values and associated preset durations (col. 28, line 23, the so-called “prepulse slide show waveforms", determined by the "look-up table method" referenced above),

the preset values in the sequence alternating in sign (col. 28, line 44-47, pairs of pulses are described which are typically of equal impulse and opposite polarity),

each preset potential difference representing a preset energy sufficient to release particles present in one of said extreme positions from their position but insufficient to enable said particles to reach the other one of the extreme positions (col. 28, line 44-47, numerous impulses of varying energy may be used, examples are given in the disclosure).

said drive means being further arranged for application of the grey scale potential difference for at least a subset of all drive waveforms (col. 7, line 39-41, the “look-up table method” in which the output signal represents a plurality of pulses, see also col. 10, line 15-27, the use of "sub-scan periods” for the relevant grey scale transition)

for setting a picture element from a preceding optical state to a grey scale in two or more pulses (col. 7, line 39-41 the use of a plurality of pulses discussed above, see also col. 10 line 15-27, the use of “double-prepulse waveforms”)

which change the optical state of the system separated by a non-zero time interval (see table 2, as well as col. 21 line 47-51, “sequence of impulses designed to accomplish an image transition”)

and are arranged for prior to application of the grey scale potential difference, driving a reset potential difference of each picture element (see fig. 8, reset pulse 304 is prior to the write image step 306)

to drive the particles to occupy an extreme position (col. 26, line 9-11, reset step 304 drives pixels to extreme white or black states)

which is determined based on which extreme position is closest to a position of the particles which corresponds to the grey scale (col. 30, line 56-59, the display can be divided into two or more groups and different reset pulses [namely driving to either white or black] can be applied to the different groups, see also col. 31, line 34-38, "the pixels may be divided into groups which use different reset steps differing in number and frequency of pulses).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zehner in view of Amundson et al. (US 7,176,880).

Regarding claim 21, Zehner fails to disclose a plurality of additional capacitors, at least one additional capacitor being connected to each picture element and to one or more storage capacitor lines.

Amundson teaches a plurality of additional capacitors (fig. 3B, storage capacitor 92', see also col. 1, line 19-21, a capacitor is at each pixel electrode), at least one additional capacitor being connected to each picture element and to one or more storage capacitor lines (col. 1, line 19-21, a capacitor is at each pixel electrode, see col. 6, line 44-46 as well as fig. 3B, capacitor 92' is connected to conductive line 16).

Zehner and Amundson are both directed to systems and methods for addressing an electrophoretic display. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the electrophoretic display of Zehner with the storage capacitor of Amundson since such a modification improves the appearance and addressing characteristics of an electronically driven display (Amundson, abstract) and can increase the voltage decay time (Amundson, col. 6, line 57-58).

Regarding claim 22, this claim is rejected under the same rationale as claim 21.

(10) Response to Argument

Appellant argues, specifically with respect to amended claims 1, 11, and 20 (amended to included limitations of claim 10), that there is no teaching or description in Zehner of at least the sequences of preset potential differences; the sequence of preset

potential differences having preset values and associated preset durations; and the potential difference representing a preset energy insufficient to enable the particles to reach the extreme positions. The examiner respectfully disagrees.

Appellant acknowledges that the potential differences provided by the look-up table of Zehner contain data representing the impulses necessary to convert an initial gray level to a final gray level (Zehner, abstract). Examiner would also like to direct attention to Zehner, col. 10, line 4-19, which discloses prepulse waveforms determined by the 'look-up table method' (see also col. 28, line 9-22). Specifically, the elements of the look-up table relate to different portions of the prepulse waveform. In these prepulse slide show waveforms, "the final (or writing) pulse is referred to as the addressing pulse, and the other pulses (the first (or erasing) pulse and the intervening (or blanking) pulses) are collectively referred to as prepulses." (Zehner, col. 28, line 17-20).

Thus, these "prepulses" of Zehner are "the sequences of preset potential differences" recited in claims 1, 11, and 20. Similarly, these prepulses have preset values and associated preset durations (Zehner, col. 28, line 9-11 and col. 10, line 15-19, the waveforms determined by the look-up table method). Also, Zehner discloses representing the impulse necessary to switch from one extreme position to the other, e.g. white to black, as I (Zehner, col. 28, line 1-4), and subsequently states that, in reference to the prepulses defined above: "These pulses will generally be equal in impulse to a full black-white pulse, **but this is not necessarily the case**. It is also only necessary that pairs of pulses have equal and opposite impulses, it is possible that

there may be pairs of widely varying impulses chained together, i.e. +I, -I, **+0.1I, -0.1I**, +4I, -4I (Zehner, col. 28, line 42-47, emphasis added). Thus, if the impulse necessary to switch from one extreme to the other is represented as **I**, then the impulses **+0.1I and -0.1I** represent "a preset energy insufficient to enable the particles to reach the extreme positions" as recited in claims 1, 11, and 20.

Therefore, Zehner discloses controlling "the potential difference to be a sequence of preset potential differences before being the grey scale potential difference (col. 28, line 17-25, namely the other pulses (defined as the first pulse and the intervening pulses) are defined as prepulses to the writing pulse),

the sequence of preset potential differences having preset values and associated preset durations (col. 28, line 9-11 and col. 10, line 15-19, the waveforms determined by the look-up table method),

the preset values in the sequence alternating in sign (col. 28, line 44-47, pairs of pulses are described which are typically of equal impulse and opposite polarity),

each preset potential difference representing a preset energy sufficient to release particles present in one of said extreme positions from their position but insufficient to enable said particles to reach the other one of the extreme positions (col. 28, line 44-47, +0.1I and -0.1I are disclosed, see also col. 28, line 1-4)."

Thus, the rejection of claim 10 (and consequently claims 1, 11, and 20, which were amended to include the limitations of claim 10) should be maintained.

Appellant's attention is also drawn to the limitations of claims 1, 11, and 20, more specifically the recitations "said extreme positions" and "the other one of the extreme positions", for which there is a lack of antecedent basis.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/KEITH CRAWLEY/

Examiner, Art Unit 2629

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/Bipin Shalwala/

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